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(54) **Vacuum cleaner nozzle**

Staubsaugermundstück

Buse d'aspirateur

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(73) Proprietor:
AKTIEBOLAGET ELECTROLUX
105 45 Stockholm (SE)

(72) Inventors:
• **Kilström, Lars Gunnar**
S-183 30 Täby (SE)

• **Lindquist, Nils Tommy**
S-123 48 Farsta (SE)
• **Sjöberg, Rolf Göran**
S-196 30 Kungsängen (SE)

(74) Representative: **Erlxson, Bo et al**
c/o AB ELECTROLUX Corporate Patents &
Trademarks
105 45 Stockholm (SE)

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Description

This invention relates to a vacuum cleaner nozzle comprising a first nozzle part having brush elements facing the floor and a second nozzle part which is movably arranged with respect to the first part and which has at least one suction opening through which air flows into an outlet tube which is connected to the nozzle.

Nozzles of the type mentioned above are commonly known and comprise complicated mechanisms for operating the relative movement between the two nozzle parts and for locking the two parts with respect to each other. When such a nozzle is used on a hard floor it rests on the brush elements, which consist of comparatively stiff bristles whereas the second part, which forms an inlet part for air and which is made of comparatively hard material, is elevated from the floor. When such a nozzle is used on a soft carpet, the nozzle parts are locked in such a position that the second part of the nozzle with the suction opening rests on the floor. Thus, the brush elements are, in the lastmentioned position, elevated above the floor and do not prevent the movement of the nozzle on the surface of the carpet.

It is also known to use so called automatic nozzles - see for instance DE 1628474. In such a nozzle the brush elements are supported by diaphragms which are under the influence of one or several springs and the subatmospheric pressure prevailing in the outlet tube. When the nozzle is moved on a hard floor, the outer portions of the brush elements abut the floor, which means that the central hard part of the nozzle forming the air inlet part is placed at a distance from the floor so that air can flow through the brush elements and into the suction opening of the inlet part. This means that a limited subatmospheric pressure prevails in the space above the membrane, but this pressure cannot overcome the spring force. The membrane and hence the brush elements remain in their lower position. When the nozzle is used on a soft carpet, the brush elements and the supporting wheels on the inlet part and, hence, the complete nozzle will sink down into the carpet, which means that the air flow through the suction opening is reduced and the subatmospheric pressure above the membrane increases so that the spring force is overcome and the brush elements are lifted up from the surface of the carpet, thereby causing the inlet part to rest directly on the floor.

There also are nozzles in which the functions mentioned above have been integrated so that it is possible to make a choice between using the nozzle as an automatic nozzle or as a nozzle which is manually operated.

A disadvantage with known automatic nozzles is that they are provided with a diaphragm of rubber or plastic which is relatively expensive and complicates the design of the nozzle.

The object of this invention is to achieve an automatic nozzle which is less complicated and less expensive than known nozzles, the nozzle also having the advantage that the nozzle "floats" on a soft floor i.e. is

selfadjusted with respect to the floor. The arrangement according to the present invention also makes possible the use of soft bristles for the brush elements which reduces friction against the floor if the bristles should touch the soft floor. This object is accomplished by the characterizing features of claim 1. Particular embodiments of the invention are set out in dependent claims 2 to 7.

An embodiment of the invention will now be described with reference to the accompanying drawing in which Fig. 1 is a vertical section through a nozzle according to the invention and Fig. 2 is a partly broken section on the line I-I in Fig. 1 which shows one half of the nozzle.

With reference to the drawings, the nozzle 10 comprises a first nozzle part 11 which, via a pivot 12, is connected to an outlet tube 13 to which a tube shaft can be fastened in a common way. The pivot 12 comprises a tube shaped middle part 14 which is fixed on the outlet tube 13 and which is supported by means of a pair of wheels 15 arranged at each side of the outlet tube 13. The middle part 14 has at its front sealing surfaces 16, at the front, which abut corresponding surfaces 17 on the first nozzle part 11, the two surfaces being movable, within certain limits, with respect to each other when the outlet tube 13 is turned in the vertical plane.

The first nozzle part 11 comprises a central knee shaped tube portion 18 with an inlet opening 19. The tube shaped portion continues into mainly flat portions 20 extending outward at each side of the tube shaped portion. These flat portions 20, at each end, are provided with downwardly directed flanges 21 supporting a wheel 22 therebetween, the axis of the wheel being parallel with the length direction of the nozzle. At the front and rear edge of the flat portions 20, there are elongated brush elements 23 with comparatively soft bristles. Bristles may also be provided below the flanges 21. Below the flat portion 20, a space 24 is formed which is circumscribed by the brush elements 23 and the flanges 21.

A second nozzle part 25 is arranged in the space 24 and forms an inlet part for air and comprises an upper mainly rectangular plate 26 at which an elongated profile is arranged. The profile has such a shape that channels are formed through which the air can flow towards a suction opening 27 in the plate 26, this suction opening being in line with the inlet opening 19 on the tube portion 18. The profile also forms relatively glossy sliding surfaces 28 on which the nozzle rests when being moved on a soft floor. The second nozzle part 25 is, via a flexible sealing 29, sealed from the first part.

The plate 26 of the second nozzle part 25, at each side of the tube portion 18 supports an upwardly extending first element 30 which is freely movable in an opening in the flat part 20. The element 30 is surrounded by a helical spring 31 which, at one end, abuts the flat part 20 and, at the other end, abuts a head 32 fixed at the element 30. There is further, near the first

element, a second upwardly extending element 33 which is also fixed to the plate 26 and which is freely movable in an additional opening in the flat part 20. This second element has a head 34 limiting the downward movement of the second nozzle part with respect to the first nozzle part.

The nozzle operates in the following way. When the nozzle is moved on a hard floor, the tips of the brush elements 23 are in engagement with the floor, and the first nozzle part rests on the wheels 22. The spring 31 has such a characteristic that the second nozzle part 25 is lifted from the floor.

When the nozzle is moved on a soft floor, for instance a soft carpet, the wheels 22 and the soft bristles will sink down into the carpet, which means that the distance between the second nozzle part 25 and the floor decreases, which results in a larger subatmospheric pressure below the second nozzle part 25. This means that the spring force is overcome, the second nozzle part is sucked towards the floor resulting in that the first nozzle part 11, with its brush elements 23, will raise over the floor. When the nozzle is moved on the soft floor it will "float" on the surface, and all the time adjust itself with respect to it.

It should be pointed out that it is possible within the scope of the invention to use other types of spring elements than those which have been described in the embodiment as well as it is possible to desist from the support wheels 22 and the wheels 15. It is also evident that instead of using brush elements, it is possible to use other types of soft materials which do not damage the floor, for instance rubber or foamed plastic.

Claims

1. Vacuum cleaner nozzle comprising a first nozzle part (11) which has brush elements (23) facing the floor and defining a space (24) in which a second nozzle part (25) which is movably arranged with respect to the first part (11) and which has at least one suction opening (27) through which air flows to an outlet tube (13) which is connected to the nozzle, **characterized** in that the second part (25) is supported by the first nozzle part (11) by means of a resilient element (31) such that the second nozzle part (25) is lifted up from the floor when the nozzle is moved on a hard surface whereas the second nozzle part (25) is lowered towards the floor when the nozzle is moved on a soft surface for instance a soft carpet.
2. Vacuum cleaner nozzle according to claim 1, **characterized** in that the second nozzle part (25) is connected to the first nozzle part (11) by means of a flexible sealing (29).
3. Vacuum cleaner nozzle according to claim 2, **characterized** in that the second nozzle part (25) comprises a plate (26) whose lower side forms an inlet

part with channels opening into the suction opening (27), and wherein the suction opening (27) is arranged centrally on the plate and the sealing (29) surrounds the suction opening.

4. Vacuum cleaner according to any of the preceding claims, **characterized** in that the opposite ends of the first nozzle part (11) are provided with a supporting wheel (22).
5. Vacuum cleaner nozzle according to any of the preceding claims, **characterized** in that the first nozzle part (11) is connected to an outlet tube (13) via a pivot (12) with at least one wheel (15) being arranged close to said pivot.
6. Vacuum cleaner nozzle according to any of the preceding claims, **characterized** in that at least one brush element is placed in front of and/or behind the second nozzle part.
7. Vacuum cleaner according to any of the preceding claims, **characterized** in that it is provided with a means (34) for limiting the downward movement of the second nozzle part (25).

Patentansprüche

1. Staubsaugermundstück, umfassend ein erstes Mundstückteil (11), welches Bürstenelemente (23) aufweist, die zum Fußboden weisen und einen Raum (24) bilden, in welchem ein zweites Mundstückteil (25) relativ zum ersten Mundstückteil (11) beweglich angeordnet ist, und welches mindestens eine Saugöffnung (27) aufweist, durch welche Luft zu einem Auslaßrohr (13) strömt, welches mit dem Mundstück verbunden ist, **dadurch gekennzeichnet**, daß das zweite Teil (25) durch das erste Mundstückteil (11) mittels eines elastischen Elementes (31) so abgestützt ist, daß das zweite Mundstückteil (25) vom Fußboden abgehoben wird, wenn das Mundstück auf einer harten Fläche bewegt wird, wohingegen das zweite Mundstückteil (25) zum Fußboden abgesenkt wird, wenn das Mundstück auf einer weichen Fläche, z. B. einem weichen Teppich, bewegt wird.
2. Staubsaugermundstück nach Anspruch 1, **dadurch gekennzeichnet**, daß das zweite Mundstückteil (25) mit dem ersten Mundstückteil (11) mittels einer flexiblen Dichtung (29) verbunden ist.
3. Staubsaugermundstück nach Anspruch 2, **dadurch gekennzeichnet**, daß das zweite Mundstückteil (25) eine Platte (26) umfaßt, deren untere Seite einen Einlaßbereich mit Kanälen bildet, die in die Saugöffnung (27) münden, und in welchem die Saugöffnung (27) in der Mitte der Platte angeordnet ist, und die Dichtung (29) die Saugöffnung umgibt.

4. Staubsaugermundstück nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß die sich gegenüberliegenden Enden des ersten Mundstückteiles (11) mit einem Stützrad (22) versehen sind. 5
5. Staubsaugermundstück nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß das erste Mundstückteil (11) mit einem Auslaßrohr (13) über einen Stutzen (12) verbunden ist, wobei mindestens ein Rad (15) nahe am Stutzen angeordnet ist. 10
6. Staubsaugermundstück nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß mindestens ein Bürstenelement vor und/oder hinter dem zweiten Mundstückteil angeordnet ist. 15
7. Staubsaugermundstück nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß es mit einer Einrichtung (34) zur Begrenzung der Absenkungsbewegung des zweiten Mundstückteiles (25) versehen ist. 20
4. Aspirateur selon l'une quelconque des revendications précédentes, caractérisé en ce que les extrémités opposées de la première partie de tuyère (11) sont pourvues d'une roue de support (22). 5
5. Tuyère d'aspirateur selon l'une quelconque des revendications précédentes, caractérisée en ce que la première partie de tuyère (11) est reliée à un tube d'écoulement (13) via un pivot (12), au moins une roue (15) étant agencée près dudit pivot. 10
6. Tuyère d'aspirateur selon l'une quelconque des revendications précédentes, caractérisée en ce qu'au moins un élément formant brosse est placé devant et/ou derrière la seconde partie de tuyère. 15
7. Aspirateur selon l'une quelconque des revendications précédentes, caractérisé en ce qu'il est pourvu d'un moyen (34) pour limiter le déplacement vers le bas de la seconde partie de tuyère (25). 20

Revendications

1. Tuyère d'aspirateur comprenant une première partie de tuyère (11) qui a des éléments formant brosse (23) faisant face au sol et définissant un espace (24) dans lequel une seconde partie de tuyère (25) qui est agencée de façon mobile par rapport à la première partie de tuyère (11) et qui a au moins une ouverture d'aspiration (27) à travers laquelle l'air circule vers un tube d'écoulement (13) qui est relié à la tuyère, caractérisée en ce que la seconde partie (25) est supportée par la première partie de tuyère (11) au moyen d'un élément élastique (31) de sorte que la seconde partie de tuyère (25) est levée du sol lorsque la tuyère est déplacée sur une surface dure tandis que la seconde partie de tuyère (25) est abaissée vers le sol lorsque la tuyère est déplacée sur une surface molle, par exemple un tapis moelleux. 30
2. Tuyère d'aspirateur selon la revendication 1, caractérisée en ce que la seconde partie de tuyère (25) est reliée à la première partie de tuyère (11) au moyen d'un joint souple (29). 35
3. Tuyère d'aspirateur selon la revendication 2, caractérisée en ce que la seconde partie de tuyère (25) comprend une plaque (26) dont le côté inférieur forme une partie d'admission avec des gorges s'ouvrant dans l'ouverture d'aspiration (27), et dans laquelle l'ouverture d'aspiration (27) est agencée au centre de la plaque et le joint (29) entoure l'ouverture d'aspiration. 40

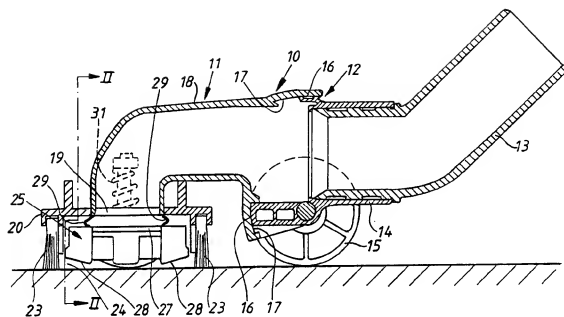


Fig. 1

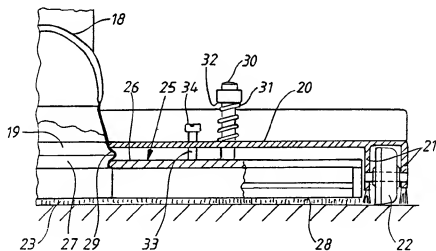


Fig. 2